openreach

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Suppliers' Information Note

For The Openreach Network

OPENREACH WHOLESALE EXTENSION SERVICE 1000 LAN & 1000ER (WES 1000 LAN, WES1000ER), WHOLESALE END TO END EXTENSION SERVICE 1000 &1000ER (WEES 1000 LAN, WEES 1000ER) and WHOLESALE EXTENSION SERVICE LOCAL ACCESS 1000 LAN (WES-LA 1000 LAN)

Service & Interface Description

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1. Introduction

This Suppliers' Information Note (SIN) describes the Wholesale Extension Service 1000 LAN (WES 1000 LAN), Wholesale End To End Extension Service 1000 LAN (WEES1000LAN) and Wholesale Extension Service Local Access 1000 LAN (WES-LA 1000 LAN).

WES/WEES services are high speed, point-to-point data circuits that are permanently connected and available 24 hours a day, 365 days per year. WES provides a secure link between a third party customer Site and the Communications Provider's (CP's) network at a CP's Site. Openreach WEES provides a secure link between a third party site and another third party site. WES-LA provides a secure link between a third party site and the serving exchange serving that site, with the circuit terminating at a CP presence at that serving exchange (a Licensed Facility in the BT Exchange).

Wholesale Extension Service LAN Extended Reach (WES1000ER) and Wholesale End To End Extension Service 1000 ER LAN (WEES 1000ER) extend the radial distance capability between customer sites. The WES/WEES1000ER product does not impact on the customer network interface characteristics described in this SIN.

Any specific technology mentioned in this document is current as of today, however it may be subject to change in the future. Should the specification of the interface be changed, this will be notified by a new issue of this SIN. Openreach reserves the right to adapt technology to deliver WES/WEES as new developments are made. All services are delivered over an uncontended transmission path.

SPECIAL NOTICE

Openreach has formally notified the withdrawal from new supply of all WES WEES BES products up and including 1Gbit/s as from 1st June 2011 along with the removal of all modify options (Bandwidth upgrade, shift, re-site & rearrange) as from 1st June 2013

Openreach have notified End of Support as from 1 April 2018 for all WES WEES BES (up to and including 1Gbits). Please refer to Openreach briefing GEN061/14 (www.openreach.co.uk)

WES WEES BES 2.5Gbit/s and 10Gbit/s will remain available along with WES Aggregation

2. Service Outline

The WES/WEES/WES-LA 1000 service operates at a speed of 1000 Mbit/s in full duplex mode between sites.

A schematic of the WES 1000/1000ER service is shown in Figure 1.

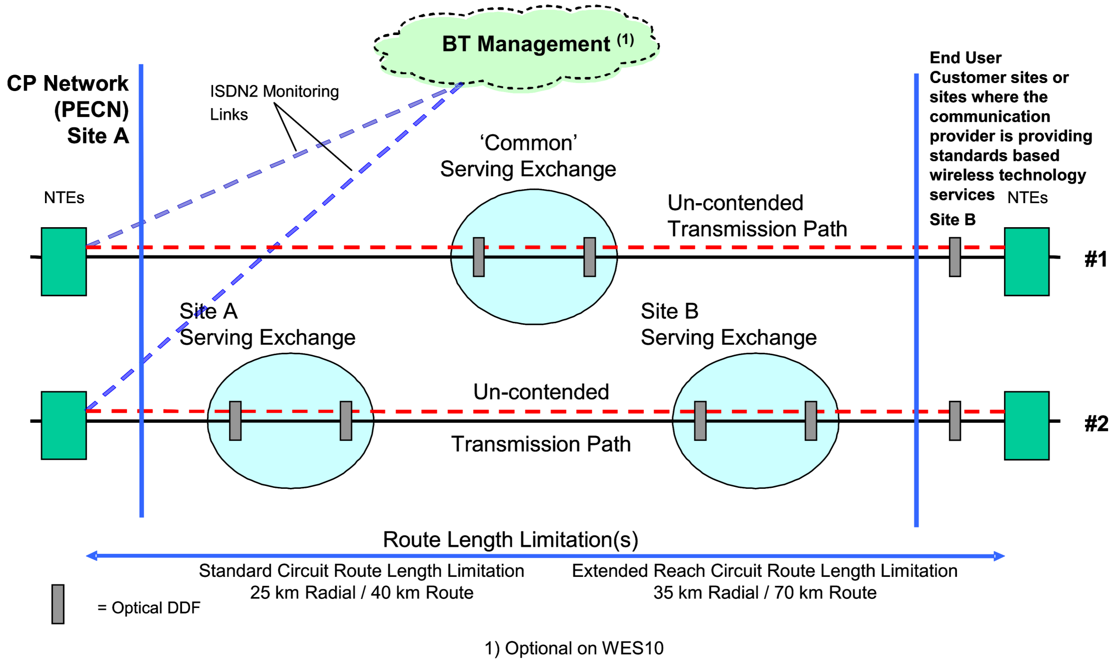
BT Management (1)
CP Network (PECN) Site A
ISDN2 Monitoring Links
NTEs
'Common' Serving Exchange
Un-contended Transmission Path
End User Customer sites or sites where the communication provider is providing standards based wireless technology services
Site B
NTEs
#1
Site A Serving Exchange
Site B Serving Exchange
Un-contended
Transmission Path
#2
Route Length Limitation(s)
Standard Circuit Route Length Limitation
25 km Radial / 40 km Route
Extended Reach Circuit Route Length Limitation
35 km Radial / 70 km Route
= Optical DDF
1) Optional on WES10

Figure 1. Typical WES 1000/1000ER Service Configuration

Note1. Figure 1 depicts two separate circuit scenarios, not a combined service.

The upper horizontal black line (#1 - NTE to NTE) represents a WES circuit where both ends have a common serving exchange.

The lower line (#2) represents a circuit where the ends are served from different exchanges.

Note2. The service cannot be purchased as a point-to-point circuit directly connected between two 3rd party customer sites, whether or not the physical route is via a BT exchange. This diagram is using current technology / delivery, this is subject to change.

A schematic of the WEES 1000/1000ER service is shown in Figure 2.

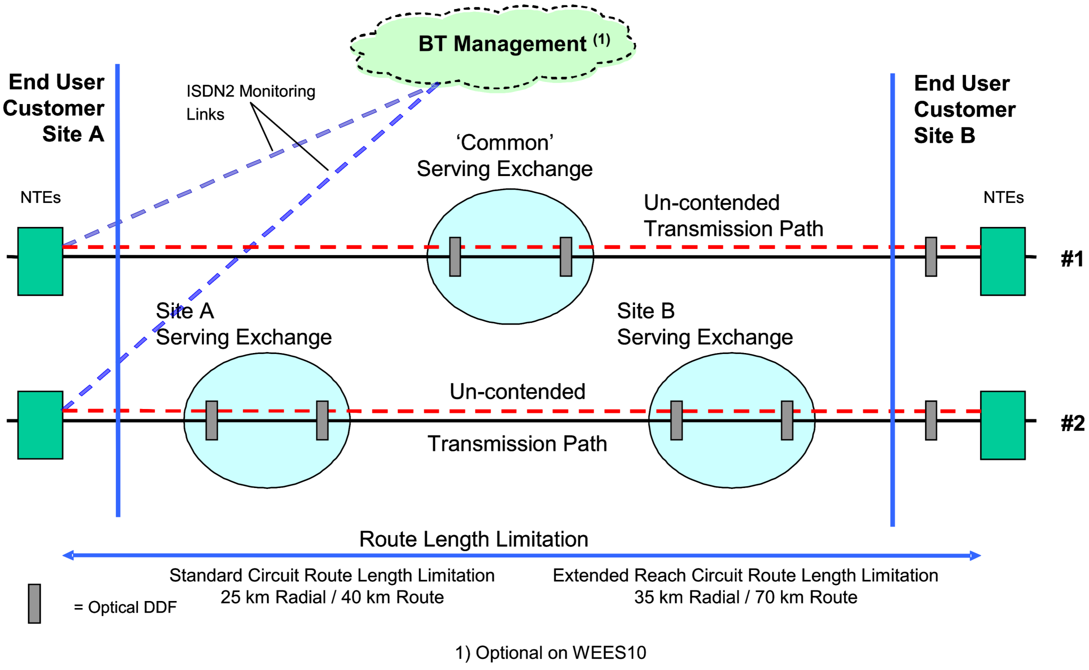
BT Management (1)
End User Customer Site A
ISDN2 Monitoring Links
'Common' Serving Exchange
End User Customer Site B
NTEs
Un-contended Transmission Path
NTEs
#1
Site A Serving Exchange
Site B Serving Exchange
Un-contended
Transmission Path
#2
Route Length Limitation
Standard Circuit Route Length Limitation
25 km Radial / 40 km Route
Extended Reach Circuit Route Length Limitation
35 km Radial / 70 km Route
= Optical DDF
1) Optional on WEES10

Figure 2. Typical WEES 1000/1000ER Service Configuration

Note 3. Figure 2 depicts two separate circuit scenarios, not a combined service.

The upper horizontal black line (#1 - NTE to NTE) represents a WEES circuit where both ends have a common serving exchange.

The lower line (#2) represents a circuit where the ends are served from different exchanges.

A schematic of the WES-LA 1000 service is shown in Figure 3.

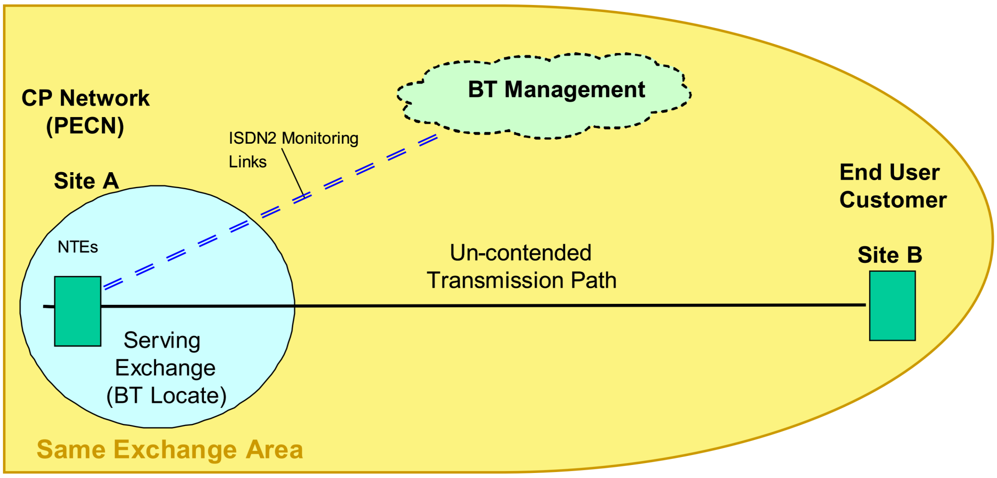
CP Network (PECN)
BT Management
ISDN2 Monitoring Links
Site A
NTEs
End User Customer
Un-contended Transmission Path
Site B
Serving Exchange (BT Locate)
Same Exchange Area

Figure 3. Typical WES-LA 1000 Service Configuration

It is envisaged that CPs / customers will use this service for the interconnection of Gigabit Ethernet Local Area Networks (LAN), Data Centres incorporating a Gigabit Ethernet backbone, and/ or disaster recovery availability when mirroring two storage areas with Gigabit Ethernet networking.

3. Customer Interface

3.1 General

Gigabit Ethernet conforms to the IEEE 802.3 standard. It is conventional Ethernet but 10 times faster than Fast Ethernet, operating at 1000 Mbit/s instead of 100 Mbit/s. Based on the IEEE 802.3z[1] Gigabit Ethernet standard, data can move from 10 Mbit/s to 100 Mbit/s to 1000 Mbit/s without protocol translation or changes to application and networking software.

3.2 Connector

The interface is the Network Termination Point (NTP), i.e. the point of connection on the BT Network Terminating Equipment (NTE) for connecting CPE or CP equipment.

The Interface consists of a Dual SC type 1000BaseSX **or** LX fibre interface port (**not both on a single NTE**). The CP / customer provides the fibre patch connectors between NTE and CP equipment/CPE. The maximum fibre length between the NTE and CP equipment/CPE is 550 metres for SX (850nm multi-mode) ports when 50/125 micron optical patch cords are used or 220 metres if 62.5/125 micron optical patch cords are used. For LX (1310nm single-mode) ports, the maximum fibre length is 3 kilometres when a 9/125 micron optical patch cable is used.

The SX and LX type interface are as specified in the Gigabit Ethernet IEEE802.3z[1] specifications. Attention is drawn to the Intellectual Property Rights (IPRs) set out in the preface of this agreed International standard. It is the responsibility of the supplier of the CP equipment or CPE to ensure that they have the necessary rights from the owner of the IPR. The IPR owner has stated that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world.

3.3 Transmission

Note: The definition of frame length includes the 4-byte CRC but does not include any preamble.

The NTE is capable of transporting IEEE 802.1q[2] VLAN-tagged frames of 1522 bytes in length, as well as being capable of transporting frames of up to 1548 bytes in length to maintain compatibility with a large number of vendor proprietary frame tagging formats. The NTE can transport frames in both directions simultaneously (full duplex) at wire-speed without frame loss or error.

The NTE does not have the capability to intercept and/or view 'customer data'.

3.4 Network Link Loss Forwarding

When a break is detected on the Openreach network link, an 8B/10B specific fault signal is continuously transmitted on the customer interface to indicate the state of the infrastructure. This continues until such time as the network break is repaired.

On the WES/WEES 1000Mbit/s products Openreach will offer the option to choose fault signalling using c1/c2 or K28.5 protocol corresponding to LLF. The chosen protocol will also apply to the User Link Loss Forwarding option on the 1000Mbit/s products.

Whilst it is expected that this will work on all customer equipment, owing to deficiencies in Ethernet standards in this area it cannot always be guaranteed.

Note: For c1/c2 signalling type to work, auto negotiation must be enabled on the customer's equipment. It is recommended in any case, that auto negation is enabled for 1000Mbit/s interfaces. Historically the default setting used for fault signalling on this service has been K28.5.

3.5 User Link Loss Forwarding

User Link Loss Forwarding (U-LLF) allows the notification of failure of a customer device at one end of a WES or WEES service to be propagated to a customer device at the other end of the same service.

User Link Loss Forwarding is available as a unidirectional service for the following managed products:

- WES 1000 (LAN)
- WES 1000 Local Access
- WES 1000 Extended Reach
- WEES 1000 (LAN)
- WEES 1000 Extended Reach

The availability of User LLF is dependent on the correct level of NTE hardware and software at each end of a circuit.

User LLF is offered as a unidirectional service only. For WES it is recommended that this is between the CP's PoP and the end user customer only. This means that the WES circuit is taken down using User LLF only if problems occur at the CPs equipment at the CP PoP site end of the circuit. If problems occur at the end user customer's equipment, the circuit will not be taken down. For WEES this can be set in either direction (A to B; B to A).

A bidirectional U-LLF service is not offered since it may complicate fault finding as it becomes extremely difficult for both Openreach and the Service Provider to determine whether the cause of the fault was due to end customer or CP PoP. Also by having this feature work in both directions may prevent some links from automatically re-establishing after an interruption.

U-LLF will use the same fault signalling type (i.e. c1/c2 or K28.5) protocol specified for N-LLF on the 1000Mbit/s products being ordered. Note: For c1/c2 signalling type to work, auto negotiation must be enabled on the customer's equipment. It is recommended in any case, that auto negation is enabled for 1000Mbit/s interfaces.

4. Power supply

4.1 General

By placing a order with BT the customer has accepted the conditions placed by BT. In relation to powering of equipment, the customer must comply with the requirements of BS7671 and the details giving within the 'DC Power Planning and Installation Guide for WES-BES Products' document.

The Openreach NTE is locally powered and offers AC or DC power options. The CP will be required to provide either a local 50 Hz AC supply in the form of standard 13 Amp power socket(s); or dual -50V DC power distributions and Earth connections, with all wiring colour schemes conforming to BS7671 (IEEE Wiring Regulations). It will be the customers' responsibility to ensure that the power supply is fused and safe for Openreach to use. These should be in close proximity to the NTE installation location.

4.2 Installation and Testing

In addition to the NTE and Chassis powering requirements below, a spare 50Hz AC mains supply 13A socket should also be provided in close proximity to the NTEs, to power BT test equipment during both initial commissioning and subsequent maintenance support activities.

4.3 AC Power Connection

AC power connection between Openreach equipment and the power socket will be made using a standard IEC320 C13-14 power lead fitted with a standard 13A plug. The NTE itself has dual power supply units internally, but only requires one AC mains supply socket.

- **For most installations:**

  This will require one mains connection for each NTE provided, and the consumption of the Openreach NTE and power unit chassis in this unmanaged service arrangement will be no more than 30 Watts per NTE.

- **For larger installations (at Openreach discretion):**

  At Openreach's discretion, where a large number of systems of one type are being deployed, a 16-slot NTE chassis version may be deployed. This will require two mains connections for each 16-slot chassis provided. The consumption with a maximum number of 16 service cards provided will be no more than 200 Watts per chassis.

4.4 DC Power Connection

The DC In-Line (Molex) connector is specified as the standard method of connecting DC power by Openreach, and represents the "Demarcation Point" between Openreach and the customer. At their site, the customer is required to provide suitable power and earth connection up to the demarcation point, and be responsible for the supply, wiring and labelling up to the demarcation point. Openreach will not supply or install the DC distribution system as part of the standard Ethernet installation.

- **Customer provided wiring up to the Openreach specified In-Line connector**

  Wiring, MCB isolation or fuse (i.e. C Type MCB or Cartage Fuse), must be provided by the customer, up to and including the DC in-line connector, as per BT's requirements stated within the 'DC Power Planning and Installation Guide for WES-BES Products' document with respect to:

  (i) Correctly rated MCB/Fuse, refer to the WES/WEES product handbook for correct rating

  (ii) Correct labelling of wiring and MCB/fuse positions compliant with BS 7671,

  (iii) Correct size of cable for required voltage drop at required maximum current,

  (iv) Separately fused isolatable A & B power supplies, as detailed in the 'DC Power Planning and Installation Guide for WES-BES Products' document.

  The in-line connector has a maximum current handling capability of 11A, and is not to be used for equipment requiring greater than an 11A supply (such as the Nortel OPTera 5200 equipment, which require 20A feeds).

4.5 Additional Details

For further details on the provision of DC Power, see the 'DC Power Planning and Installation Guide for WES-BES Products' available on the Openreach Ethernet website.

If there is a conflict between DC power information contained in the 'DC Power Planning and Installation Guide for WES-BES Products' and the SIN document, the order of precedence shall be as follows:

(a) DC Power Planning and Installation Guide for WES-BES Products

(b) SIN

5. Customer Apparatus Design / Installation Advice

The WES 1000 service has been designed such that any vendors' switch or router that has IEEE 802.3z compatible interfaces of the SX or LX variety will be able to connect to each NTE.

6. Technical Specification

Protocol	Gigabit Ethernet IEEE 802.3z
Line Rate	1.25 Gbp/s

Maximum Bit Error Rate	10^{-12}
Power Requirement	Mains voltage 50 Hz AC input
Customer Fibre Connector	SC type
SX Fibre Cable *Customer provided*	Multi-mode 850nm, 50/125 or 62.5/125 micron patch
SX Fibre *Maximum Delivery Distance*	550m from NTE's SX port using 50/125 micron patch 220m from NTE's SX port using 62.5/125 micron patch
LX Fibre Cable *Customer provided*	Single-mode 1310nm, 9/125 micron patch
LX Fibre *Maximum Delivery Distance*	3Km from NTE's LX port
Operating Temperature	0° to 40° C
Laser Safety	Class 1 under all conditions as per IEC 825-1

7. Further Information

For enquiries concerning connection availability between particular sites and for further information on the WES 1000 service please contact your Openreach Sales & Relationship manager or see http://www.openreach.co.uk/orpg/products/wes/eoiwes.do

8. References

IEEE Standards:

[1]	IEEE 802.3z	IEEE standards for Gigabit Ethernet in the LAN/MAN environment	1998
[2]	IEEE 802.3q	VLAN tagging of ethernet frames	1998

9. Abbreviations

CP	Communications Provider (Providers of Electronic Communications Services)
CPE	Customer Premises Equipment
CRC	Cyclic Redundancy Check
DDF	Digital Distribution Frame
IEEE	Institute of Electronic & Electrical Engineers
IPR	Intellectual Property Rights
LAN	Local Area Network
LES	LAN Extension Service

LX	Long Wavelength (1310nm)
MCB	Mini Circuit Breaker
NTE	Network Terminating Equipment
NTP	Network Terminating Point
SAN	Storage Area Network
SHDS	Short Haul Data Service
SIN	Suppliers' Information Note
SX	Short Wavelength (850nm)
VLAN	Virtual Local Area network
WES	Wholesale Extension Service

10. History

Issue 1.0	15 Oct 2004	First Issue
Issue 1.1	22 Oct 2004	"Customer" clarified. Figure 1 replaced. Editorial changes.
Issue 1.2	29 Sept 2006	Changes made for Equivalence of Input compliant products, including addition of WEES.
Issue 1.3	21 Dec 2006	Addition of WES-Local Access (WES-LA)
Issue 1.4	7 Mar 2007	Contact details in "Further Information" clause updated.
Issue 1.5	26 Oct 2007	Service description amended in accordance with updated DC power guidance
Issue 1.6	13 Oct 2008	Amended in order to add new sections on Network Link Loss Forwarding and User Link Loss Forwarding.
Issue 1.7	25 Jun 2009	Editorial amendments, including general clarifications and updated references
Issue 1.8	February 2011	Amended to notify no new service will be made available
Issue 1.9	February 2013	Amended to notify no new supply of Shift, re-arrange, resite or bandwidth upgrade on all WES WEES BES (up to 1G/bit) as from 1st June 2013
Issue 1.10	February 2015	Amended to notify End of Support as from 1 April 2018 for all WES WEES BES (up to and including 1Gbits). Change SINet site references from http://www.sinet.bt.com to http://www.btplc.com/sinet/
Issue 1.11	May 2020	Change SINet site references from http://www.btplc.com/sinet/ to https://www.openreach.co.uk/orpg/home/helpandsupport/sins/sins.do
Issue 1.11	September 2021	Product notified end of life. No changes required.
Issue 1.11	October 2022	Annual Review – branding and font changes only – issue remains unchanged.
Issue 1.11	October 2023	Annual Review – no changes made – issue number therefore remains the same

Issue 1.11	October 2025	Product notified end of life. No changes required.

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